J. Bamboo and Rattan, Vol.8, Nos. 3&4, pp. 115-130 (2009)

Rattan and bamboo production trends in the Philippines and implications to policy and forest conservation

Ramon A. Razal*
Department of Forest Products and Paper Science, UPLB College of Forestry and Natural Resources College, Laguna 4031 Philippines

Abstract: The study was undertaken to examine available official information on the production of rattan and bamboo in the Philippines and relate it to policy and regulations that pertain to exploitation and utilization of these resources. Data sets available from annual statistics published from 1997 to 2006 by the Forest Management Bureau of the Department of Environment and Natural Resources on the production of bamboo poles and rattan, permits and contracts granted, and collection of forest charges were collated and analyzed. Bamboo production had its peak in 2000, but on average, the quantity produced in subsequent years declined, although a slight recovery was seen in more recent years. Forest was not the predominant land use in the provinces that produced large quantities of bamboo. Rattan poles were being sourced from the provinces that still have relatively large forest areas. Rattan production appears to go along side timber production as Region 13, the countryís major producer of logs, had also played a dominant role in supplying rattan poles. The forests of Region 13 might be undergoing severe strain, with only about 12.4 per cent of its forest being considered as closed forests, compared with the rest of the country which on average, consists of 35.7 per cent closed forests. Revision of policies pertinent to the monitoring, recording and reporting of information on rattan and bamboo, estimating allowable harvests, and the grant of incentives for rattan and bamboo plantation development are also proposed.

Keywords: Bamboo, rattan, forest charges, non-wood forest products, forest policy and conservation.

INTRODUCTION

The recent surge in interest in non-wood forest products (NWFPs), which include rattan and bamboo, owes to the perceived benign effects on the forest ecosystem of extracting these resources as opposed to timber. For this reason, the collection of some NWFPs is hardly restricted, even in protected forest areas. The collection of bamboo, rattan, resins,

*E mail: ramoncfnr@yahoo.com

vines, leaves, and food products derived from the forest is seen to provide livelihood for forest-dependent populations while keeping the forests relatively intact.

In reality, limited proof has been offered in the scientific literature on the real effects of NWFP exploitation on the forests. Evidence has yet to be shown that harvesting and collecting NWFPs contributed little or none at all to the deterioration of Philippine forests. No systematic study has been undertaken in the Philippines to verify whether the gathering of NWFPs has not really resulted in substantial damage to the mountains and upland countryside areas.

On the contrary, popular and anecdotal evidence suggests otherwise. Stories have been told describing how difficult the harvesting of rattan has become, with rattan gatherers needing to travel longer distance and to go deeper into the forests to find rattan poles. Not only has it become more difficult to locate these resources, but the quality of harvested materials appears to be poorer and the sizes, smaller.

While nowhere in these stories is there a categorical statement that the forests were destroyed as a result of NWFP harvesting, they seem to indicate that forests were no longer the same as they were when people exploited the jungles for NWFPs. From the policy standpoint, the absence of conflict between NWFP harvesting and the state of the forest can provide the basis for rules pertaining to access and tenure that could have an impact on the movement and economic activities of forest-dependent people and communities.

The present study is an exploratory attempt to analyze trends in NWFP production and relate it to the policy and forest conservation. The objective is not to curtail the harvest of NWFPs, an activity that is believed to promote equity in access to forest resources particularly among the poor who have little capital and technological resources, but to safeguard against abusive NWFPs exploitation. The long-term goal is the development of more responsive policy for the rational extraction and utilization of these valuable, yet seemingly neglected, resources.

METHODOLOGY

Data presented in the Philippine Forestry Statistics (PFS) from 1997 to 2006, on land use and forest cover, NWFP production and exports, particularly on bamboo and rattan, were summarized in matrix format and analyzed. These statistics are published yearly by the Forest Management Bureau of the Department of Environment and Natural Resources (FMB ñ DENR, 1970, 1971, 1997- 2006). Where possible, cross-checking of information with observations from some sites visited or where the author had on-going and/or previous studies on NWFP policies, on forest-based livelihood opportunities in community-based forest management areas, and on best practices in forest conservation study was done.

Other information culled from the PFS and subsequently analyzed in relation to NWFP production includes the data on land use, the quality of forest cover (closed versus open forests), and forest charges collected.

RESULTS

Bamboo

Although bamboo has not been specifically itemized as a forest product[1] as per Revised Philippine Forestry Code (PD705. 1975)[2], record of its production has always been included in the list of ìminor forest productsî which later on officially became known as non-timber forest products (NTFPs). Apart from bamboo poles, there had been a separate line item for ìbohoî or ìbuhoî production, defined in the Glossary section of Philippine Forestry Statistics as ìa bamboo species having an erect and thin-walled culm and used (by paper mills in the manufacture of bleach paper) for sawali making, basketry, fences, musical instruments, *etc.*

Figure 1 shows the production of bamboo poles (in number of pieces), for the period 1997-2006, for the entire country and for the top five provinces that were the biggest producers of bamboo over the 10-year period. Production peaked in 2000, solely on the contribution from the province of Camarines Sur in Luzon, although the provinceís one year dominance was never replicated. Apart from Camarines Sur, the other provinces that had consistently made it as top bamboo producers were Davao del Norte, Pangasinan,

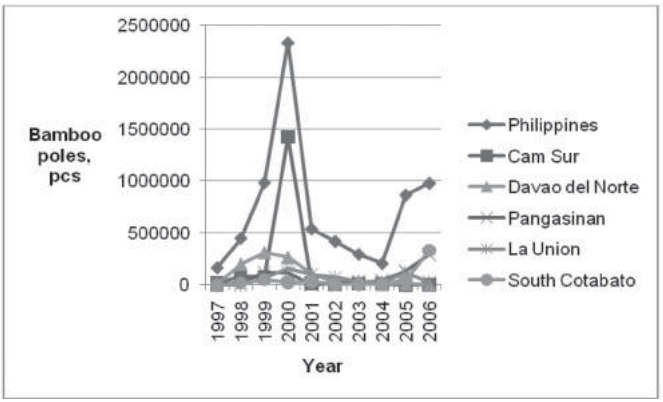

Figure 1. Production of bamboo poles in the Philippines and in the top 5-bamboo producing provinces, 1997-2006. (PFS, 1997-2006).

[1] Definition of forest products as per PD 705 ñ Forest product means timber, firewood, pulpwood, bark, tree top, resin, gum, wood, oil, honey, beeswax, nipa, rattan, or other forest growth such as grass, shrub, flowering plant, the associated water, fish, game, scenic, historical, recreational, and geologic resources in forest lands.

[2] PD 705 (Revised Philippine Forestry Code) ñ Presidential Decree issued by Pres. Ferdinand E. Marcos dated May 19, 1975, entitled ìRevising Presidential Decree No. 389, otherwise known as the Forestry Reform Code of the Philippines.î

La Union, and South Cotabato. Three of these provinces are in Luzon, each having a forest cover to total land ratio of 30.6 per cent for Camarines Sur, 24.1 per cent for Pangasinan, and 19.3 per cent for La Union, while that for Mindanao provinces are 63.4 per cent for Davao del Norte, and 49.4 per cent for South Cotabato. Other provinces that made it to the top ten bamboo producers are Quezon, Abra, Davao del Sur, Zamboanga Sibugay, and Davao Oriental. Several other provinces contributed to bamboo production over the 10-year period, but insignificant production from the provinces in Regions 2, 3, 7, 10, and 13 was noted. No production was reported for the provinces in Regions 4-B, 6, 8, and ARMM. Despite the reported absence of production in Region 6, monthly prices were available for bolo (*Gigantochloa levis* (Blanco) Merr.) and Kawayan tinik (*Bambusa blumeana* J.A. & J.H. Schultes) in the region. Average monthly prices for sawali (woven bamboo used for paneling) were also available for all regions except CAR, Regions 5, 8, 9, 11, and ARMM.

In terms of bamboo pole produced per hectare of forest land (on the assumption that the bamboo poles were sourced solely from forest lands), La Union with only a total forest area of 28,866 ha recorded highest production of almost 20.4 poles per ha during the 10-year period. This was followed by Camarines Sur at 10.1, Pangasinan at 5.8, and then Davao del Norte and South Cotabato at 1.9 and 1.3 bamboo poles per hectare, respectively. As it is unlikely that the forests of La Union, Pangasinan, and Camarines Sur were dominated by bamboo from where the province has presumably been sourcing the raw material, a more plausible explanation is that more bamboos were being gathered from A and D lands, noting the larger proportion of A and D lands in these provinces. This is in keeping with the observations of Virtucio and Roxas (2003); Virtucio and Torreta (2008) who noted that most bamboo plantations in the country were located in low elevation areas that must have already been alienated to private land owners.

Unsplit rattan

Production of unsplit rattan poles had been recorded for 45 of the Philippinesí 79 provinces, or in almost 3 out of every 5 provinces in the country. All the geographic regions (except the National Capital Region, NCR) contributed their share in producing rattan for the period 1997-2006, albeit in widely varying amounts. Region 13 had been the largest rattan producer, accounting for almost half the volume of rattans produced during the 10-year period. All provinces in Region 13 contributed significant volumes to the countryís production of rattan poles. It should be noted that Region 13 is also the countryís top timber producer. A far second was Region 4-B, mainly on the strength of rattan production in Palawan, at 16.6 per cent of total production, and then Region 11, consisting of the Davao and Compostela Valley provinces. Region 2 in Luzon and Region 8 in the Visayas completed the top five rattan producing regions in the country. Overall, these five regions had accounted for 92 per cent of rattan production in the country during the 10-year period.

The 10-year trend in rattan production from these five regions and that of the country is shown in Figure 2. Philippine rattan production had essentially gone along with the production trend of Region 13, except for the sharp spike in 2000 that could primarily be attributed to the unusually large production volume from Region 4-B, mainly from Palawan. After 2000 however, rattan production from Region 4-B had drastically fallen. In 3rd spot is Region 11, whose production over the years has been relatively steady. For Region 8 and especially Region 2, production trend had not been consistent, showing drift towards diminishing volumes in more recent years. The almost similar shape of the graphs for bamboo (Fig. 1) and rattan (Fig. 2) production in the Philippines suggests complementary demand for these NWFPs, possibly driven by consumer preferences for products made of these natural materials.

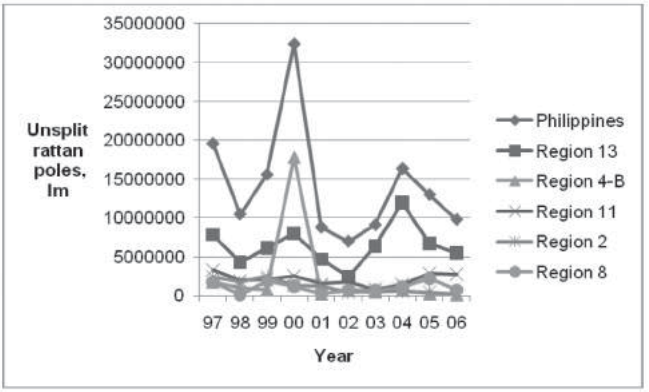

Figure 2. Rattan production in the Philippines and in the top 5 producing regions, 1997-2006 (PFS, 1997-2006).

At the provincial level, five of the top ten rattan producing provinces over the ten-year period are in Mindanao, namely Agusan del Sur, Davao Oriental, Surigao del Sur, Agusan del Norte, and Surigao del Norte at 1, 3, 4, 5 and 10 positions, respectively (Fig. 3). The second highest producing province is Palawan and then two other

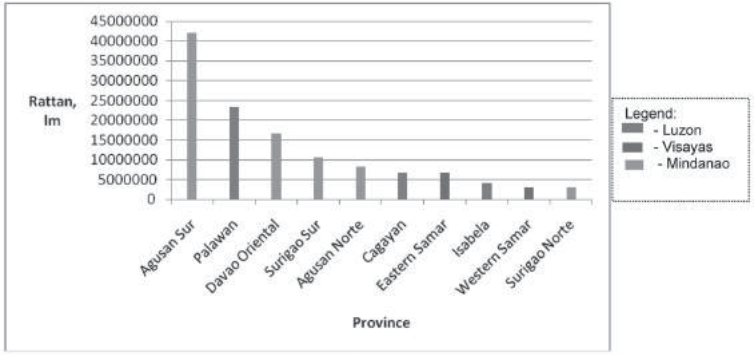

Figure 3. Top ten rattan-producing provinces in the Philippines, 1997-2006 (Source: PFS, 1997-2006).

provinces from mainland Luzon, namely Cagayan and Isabela, make it to 6 and 8 respectively. The rest of the top ten provinces are made up of Eastern and Western Samar at 7 and 9, respectively, from the Eastern Visayan region. The top ten provinces contributed 87.7 per cent of rattan production all over the country for the period 1997-2006.

Production data for rattan simply present an aggregation of the total volume, without regard for the diameter and species of the rattans produced. In reality, the rattan group of climbing palms comprise of several species, although only a few are being exploited commercially. Thus, official data have little value in elucidating the size distribution, pole quality or species diversity of rattans from the different regions. Neither is it useful in providing trends in terms of what particular species are declining in supply and/or what species had been much highly sought after in the market.

The annual forestry statistics also presents information pertaining to rattan cutting contracts (RCC) awarded. For the last 10 years, statistics was available for all years except in 2001. The listing, which used to be called rattan cutting permits until 1990, contains information on the number of RCCs awarded, total area covered, and the annual allowable cut for all contract recipients for each province. Table 1 gives summary on the top 5 regions with the highest number of RCCs, largest area covered, and largest annual allowable cut. It can be seen from the Table that the same five regions comprise the top five for all categories. Three of the regions are in Mindanao and two are from Luzon. Among the 5 regions with the highest AACs, only Region 12 did not land in the top 5 rattan-producing regions. Region 8 in the Visayas displaced Region 12 in actual rattan pole production.

Table 1. Top ranking regions in terms of rattan cutting contracts, area, and annual allowable cut from 1997-2006. (Source: PFS, 1997-2006)

Regions with largest no. of RCCs		Regions with largest areas for rattan cutting		Regions with largest rattan AAC	
Region	No. of RCCs	Region	Total Area of RCC, has	Region	Total rattan AAC, lm
R-11	233	R-13	3,133,898	R-11	272,524,068
R-13	205	R-11	2,132,947	R-12	116,079,307
R-4B	165	R-4B	1,633,369	R-13	112,850,624
R-2	141	R-12	1,135,772	R-2	51,325,848
R-12	94	R-2	1,038,364	R-4B	46,448,868

Table 2 is similar to the preceding Table, except that it had been organized according to provinces instead of regions. Most provinces that appear in one category can be found in the two other lists (Palawan, Agusan del Sur, Davao Oriental, Davao del Norte, Cagayan, Surigao del Sur, South Cotabato, and Davao del Sur), but 6 other provinces appeared just once. To determine whether this was indicative of consistency in awarding of RCCs, calculations were made on allowable cut as well as area per cutting contract. Results showed great variance in the data, and indirectly, in the manner

Table 2. Top ranking provinces in terms of total number of rattan cutting contracts, total area, and total annual allowable cut from 1997-2006

Provinces with largest no. of RCCs		Provinces with largest areas for rattan cutting		Provinces with largest rattan AAC	
Province	No. of RCCs (1997-2006)	Province	Total Area of RCC, has (1997-2006)	Province	Total rattan AAC, lm (1997-2006)
Palawan	150	Surigao del Sur	2,217,274	Davao del Norte	134,126,702
Agusan del Sur	116	Palawan	893,640	Davao Oriental	93,237,107
Davao Oriental	98	Davao del Norte	890,572	South Cotabato	62,726,307
Davao del Norte	86	Davao Oriental	800,441	Agusan del Sur	56,349,850
Cagayan	82	Agusan del Sur	787,739	Surigao del Sur	52,704,526
Surigao del Sur	73	Mindoro	661,879	Davao del Sur	45,160,259
Davao del Sur	49	Cagayan	604,735	Palawan	45,102,520
Aurora	48	South Cotabato	589,210	Lanao del Sur	43,469,820
Zamboanga del Norte	46	Apayao	564,800	Sarangani	26,866,087
South Cotabato	43	Davao del Sur	441,934	Cagayan	26,815,395

of awarding RCCs across provinces. AACs awarded per contract holder were found to vary from 59,000 linear meters (lm) in Mindoro to more than 3.3M lm in Lanao del Sur, while on a per hectare (ha) basis, the range was from 1 lm/ha for Mindoro to 382 lm/ha for Lanao del Sur. With respect to area per rattan cutting contract, the smallest was at 310 ha in Pangasinan and the largest was at 73,542 ha in Mindoro.

Subsequent comparisons were then made to relate the data for rattan production with the rattan cutting contracts and the grant of annual allowable cuts over the 10-year period. Figure 4 shows how actual rattan production from 1997-2006 fared in meeting rattan AACs issued in the span of 10 years (Note the missing bar for AAC in 2001 when no information was available from the PFS).

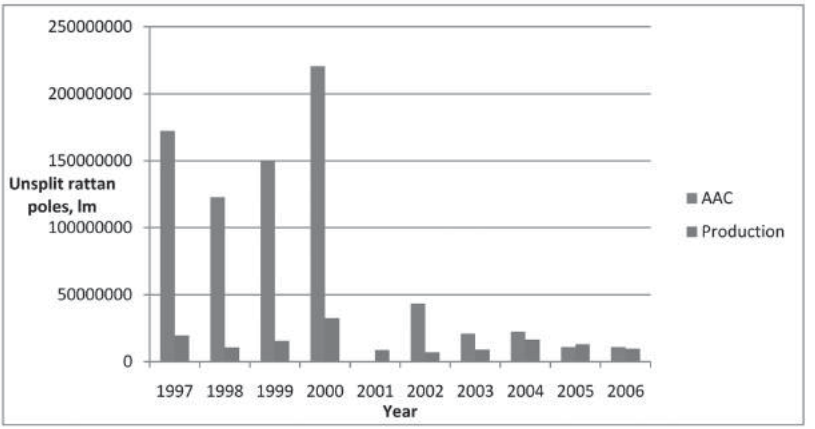

Figure 4. Comparison of actual production of rattan with annual allowable cuts from 1997-2006 (Source:PFS, 1997-2006).

It could be seen from the graph that from year 1997 until 2000, actual rattan production barely made a dent on what could potentially be produced. The AACs that government awarded to the recipients of RCCs in those years was considered as the potential rattan production for the period. The large discrepancy between actual rattan production and allowable cuts raise a lot of questions, particularly on issues pertaining to the manner in which estimates of AACs were arrived at, on whether there had been actual inventories or assessments made, or if monitoring and recording of production data had been undertaken. The data should also be looked at in terms of the demand and supply of rattan poles, and what the implications had been with regard to market opportunities for farmers and for the rattan industry as a whole. From 2002 to 2006, however, the gap between AAC and actual production had narrowed, although overall, rattan production also had declined relative to the first half of the 10-year period.

At the level of the province, at least 10 (Benguet, Ifugao, Bulacan, Tarlac, Sorsogon, Capiz, Negros Occidental, Bohol, Zamboanga Sibugay and Compostela Valley) that had records of rattan production showed no record of rattan cutting contract being issued in the last 10 years. Conversely, at least six provinces (Pangasinan, Camarines Sur, Sultan Kudarat, Zambales, Maguindanao and Romblon) that had been awarded rattan cutting contracts in the last 10 years had no record of any rattan being produced.

Some calculations were done to further relate rattan production with the rattan cutting contracts issued. Ratios on per cent utilization of AAC, rattan produced per RCC and per RCC contract area for each individual province were determined. The results for the top ten provinces for each of the ratios are shown in Table 3. Results show that the same four provinces (Surigao del Norte, Agusan del Norte, and Agusan del Sur from Region 13 and Eastern Samar from Region 8) in exactly the same order, topped all the three categories. Three other provinces (Palawan in Region 4-B, and Western Samar and Southern Leyte in Region 8) appear in all categories, albeit in varying sequences.

Table 3. Summary of calculations to determine ratios of aggregate rattan production with aggregated AAC, no. of RCCs, and RCC area (has) from 1997-2006, for the top ten provinces in each category

% Utilization of AAC		Rattan production (lm) per RCC		Rattan production (lm) per hectare	
Province	Rattan (lm)/AAC	Province	Rattan (lm)/RCC	Province	Rattan (lm)/ha
Surigao del Norte	1043	Surigao del Norte	757,286	Surigao del Norte	605
Agusan del Norte	105	Agusan del Norte	685,431	Agusan del Norte	66
Agusan del Sur	74	Agusan del Sur	362,635	Agusan del Sur	53
Eastern Samar	56	Eastern Samar	170,300	Eastern Samar	38
Southern Leyte	52	Davao Oriental	169,703	Western Samar	31
Palawan	51	Palawan	155,005	Palawan	26
Western Samar	43	Surigao del Sur	145,692	Southern Leyte	24
Isabela	29	Lanao del Norte	132,701	Lanao del Norte	23
Cagayan	24	Southern Leyte	124,203	Davao Oriental	20
Oriental Mindoro	24	Western Samar	121,453	Isabela	17

Six other provinces made it to the lists, appearing in at least one of the categories mentioned.

Surigao del Norte topped all the lists, having exceeded its AAC by more than 1000 per cent, on account of its having only a one-year record (1997) of RCCs being issued to its two contractors during the 10-year period, for an area of only 5,000 ha. Rattan production from the province had been reported for 6 years with none for 1997 when it was supposed to have legitimate rattan cutting contractors. The provinceís rattan resources would have been adversely affected, on the assumption that the formula for calculating AACs had correctly set the proper limits to insure sustained yield of rattans.

The above results for the top producing provinces should also be weighed against those that did not make it to the list. Provinces with low rattan production outputs had utilized less than 17 per cent of their AACs, (with some even lower than 1 per cent), or were harvesting at less than 17 lm/ha (some with even less than 1 lm/ha). It would be interesting to determine what would be the minimum production per hectare per year, or even per contract, so that the rattan cutting contract holder would still be able to realize some economic gains from engaging in this activity. Conversely, it would be helpful if above information could be used as guide for awarding subsequent rattan cutting contracts so that the harvesting operations will remain within sustainable production limits.

Forest charges collected

Forest charges on NWFPs pertain to levies imposed by the government on products that were cut or harvested by the permittee/gatherer from the state forestlands. Rates are prescribed by Republic Act (RA) 7161 (Forest Charges Law, 1991) but only the following NWFPs are subject to said fees - rattan, gums and resins, beeswax, gutta percha, almaciga resin, and bamboo, at 10 per cent of the actual free-on-board (FOB) market price. The harvesting of planted forest products from plantations and private lands are exempted from payment of forest charges.

Figure 5 shows the amount of forest charges collected from NWFPs for the period 1997-2006. The graph for total forest charges sums up all forest charges collected from the harvesting of rattan poles, bamboo, resins, and split rattan. It is evident from the data that collection from unsplit rattan comprised the bulk of NWFP forest charges, with bamboo, resins and split rattan contributing little to the intake of fees. The highest amount collected at Php11.5M occurred in 2004, although this did not entirely match the year when rattan production was at its highest, *i.e.*, in 2000 (Fig. 4). A more detailed analysis of the forest charges data was made difficult by the incomplete information on the nature of rattan and bamboo harvested, as the implementing guidelines on forest charges (Department Administrative Order (DAO) 2000-63) imposes different rates on the basis of species, size, and origin of the product.

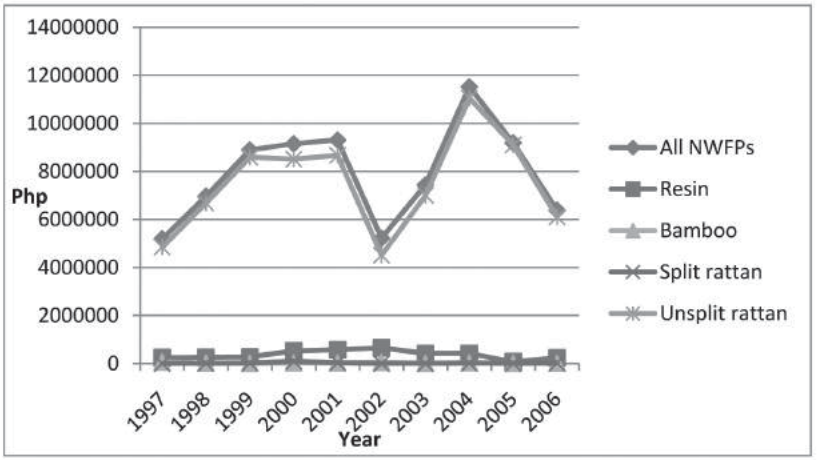

Figure 5. Forest charges collected from NWFPs from 1997-2006. (Source: PFS 1997-2006).

The small amount collected from bamboo relative to the reported production volumes is seen to corroborate further the findings that bamboos are being sourced more and more from private lands than from public forestlands, and therefore, exempt from the payment of any fees.

DISCUSSION

Reliability of data

This study basically relied on NWFP statistics published by the FMB-DENR. Information published by the agency is based solely on reports received from DENR field offices by the Forestry Economics unit of the Bureau. According to FMB, information submitted is subjected to a review process, and if there are questions, the attention of the concerned regions is called and/or field visits are undertaken to validate the reports. It is not clear how FMB deals with delayed reports, or the absence of production data from locations that obviously have those specific products, and whether data are being verified or cross-checked through other means or sources or with available market information. Because of the absence of data for most provinces, one cannot help but ask how much leeway has been given to the field officers to determine what information to relay to the higher offices and the consequent effect on transparency of transactions and reliability of information.

The following were noted which make the truthfulness of the information contained in the statistics suspect: a) incomplete or blank entries not just for one reporting period but for prolonged duration; b) provinces not being placed correctly in the region to which they belong and subsequently affecting totals per region; c) double entry for some provinces or reporting under the old names of provinces/islands that have already been split to several new provinces; d) repetitive or similar data; e) unspecified

dimensions (*e.g.* bamboo poles); f) unspecified species (rattan); and g) export data exceeding production data. Statisticians may also find it apt to call some of the entries ìoutliersî because they are outside of what one might reasonably consider as normal range. All these point to the need for DENR to thoroughly evaluate the system in place for reporting, compiling and processing NWFP data and to install a mechanism for eliminating or at least minimizing errors. Perhaps, it can benefit from the system in use for agricultural products such as the one being implemented by the Philippine Bureau of Agricultural Statistics (BAS), which subjects the information through rigorous statistical testing and to many layers of checking and cross-checking (BAS, 2009). The Food and Agriculture Organization of the United Nations (FAO, 1998) had earlier expressed its reservation on the reliability of the Philippine data on NWFPs.

Given the difficulties encountered in the present study, it is admitted that it has used non-statistically verified data in the absence of other available sources. NWFPs have not attracted a lot of interest before, so statistics presented on these resources had not been rigorously examined in the past; hence, the apparent lapses and/or gaps in available statistics that were seemingly allowed to continue over time. The present study could be the first serious attempt to make sense of available official information on NWFPs in the Philippines, but would not venture towards serving as an excuse for the quality of information thus far provided. At best, it is a call for more rigorous and timely reporting, generating and publishing of NWFP information.

Deficient as the data would seem, the present study contends that the findings are useful in defining trends in the production and utilization of rattan and bamboo in the Philippines in the last few years. The specifics with regard to differences between provinces and/or regions may be open to discussion and would warrant a more thorough investigation.

Sustainability of NWFP resources *vis a vis* the forest

The heart of the present study is to determine the impact of extracting NWFPs on the forests. To be direct about its outcome is to state that the findings cannot be used to provide a straightforward answer. Along the way, it has become obvious that the question is far too complex to be resolved by a cursory study that has very limited resources as the one available for the present effort. The trends in production of rattan and bamboo are discussed in relation to reported occurrence and distribution of the various species belonging to these plant groups.

Rojo *et al.* (2000) reported the occurrence of 62 bamboo species in the Philippines as of 1996. Nine species are considered economically important as follows: kauayan tinik (*Bambusa blumeana* Schultes f.), kauayan kiling (*B. vulgaris* Schrad.), giant bamboo (*Dendrocalamus asper* (Shultes f.) Backer *ex* Heyne, Bayog (*D. merrillianus* (Elm.) Elm.), kayali (*Gigantochloa atter* (Hassk.) Kurz), bolo (*G. levis* (Blanco) Merr.),

anos (*Schizostachyum lima* (Blanco) Merr.), buho (*S. lumampao* (Blanco) Merr.), and laak (*Sphaerobambos philippinensis* (Gamble) S. Dransf. Depending on the properties of the species, they can be used for construction, furniture, basketry, fresh water fishery, and poultry industries.

Rattans, on the other hand, belong to the palms, but of the climbing variety. There are close to 70 species of rattan in the Philippines belonging to four genera. Twelve species are considered commercially important, but the six most common ones that are specifically mentioned in the guidelines on forest charges (DAO 2000-63) are palasan (*Calamus merrillii* Becc.), kurakling (*C. microsphaerion* Becc. var. *microsphaerion*), kalapi or limuran (*C. ornatus* Blume var. *philippinensis* Becc.), ditaan (*Daemonorops mollis* (Blanco) Merr.), sika (*C. caesius* Blume) and arorog (*C. javensis* Blume). The last two species belong to the small diameter rattans.

The studyís research framework was an attempt to correlate NWFP extraction data with the quality of the forests where NWFP resources were being harvested over time. The hypothesis was that exploiting forests for NWFPs does little to adversely harm the ecosystem. It was soon realized that this would be a nice experiment to pursue in a controlled set-up, but with the available secondary information, the question was far too complicated to resolve, not to mention the limitations in time and resources. The absence of data on how changes have taken place within the forests over time, and the exact manner of accessing the NWFPs and actors involved, exact location of extraction sites, and quantity of resources being removed from the forests are desirable data that could be very useful but which could not be had. The gathering of NWFPs was not the only human activity that was happening inside the forests. There were other pressures, both human and non-human, to which the forests were being subjected to, and it was not feasible to isolate the effects of one from the rest.

For rattan, production trends show diminishing quantities over time. The production of bamboo was relatively constant. It was also noted that rattans were still largely sourced from forest areas. Bamboo, however, was being derived less from forests than from low altitude, non-forest lands. Another difference is that forest charges are strictly imposed on rattan, while bamboos that are grown in plantations are exempt from charges. Thus, it appears that there is a need to factor in the effects of forest charges on actual production (and reporting) in evaluating information that impinges on the relationships between NWFP production and forests.

The provinces from which significant amounts of bamboo poles had been removed were Davao del Norte and South Cotabato in Mindanao and Pangasinan, La Union and Camarines Sur in Luzon. For rattans, the timber corridor provinces, as well as Palawan, Samar, Davao Oriental and Cagayan provided the biggest harvest volumes. The percentage of forestlands in many of these provinces exceeds 50 per cent, although notable exemptions are Camarines Sur, La Union and Pangasinan which are all in

Luzon. The implication is that provinces where large forest areas have remained can sustain production of forest-based NWFPs. It seems that timber production and rattan production can go together, as Region 13 is both the countryís largest source of both timber and rattan. Bamboo is already predominantly lowland-based but the impact of diminishing forests on its sustainability remains to be seen.

On average, forests classified as closed for the entire country was at 35.7 per cent. In many provinces that contributed significantly to the production of various types of NWFPs, the quality of the forest measured in terms of per cent closed forest, was mostly above the national average. This tells us that existence of good forest cover is essential to carry on NWFP production. However, there is not enough information to determine how sustained NWFP harvesting has affected the quality of forest. Region 13, which is the countryís largest timber and rattan producer, appears to be a notable exception as the proportion of closed forest in the region was only 12.37 per cent. The region is acknowledged to have developed tree plantations, which have been the source of timber produced. It remains to be seen whether the region can sustain being both the top timber and rattan producer given the quality of its forest cover.

A final point is to reflect on the question that had been asked. Indeed, is it correct to determine the impact of NWFP extraction on the forests, or should it not be the other way around, *i.e.*, to ponder on whether forests are protected and conserved enough to ensure that NWFPs are not threatened? Rattans, for instance, need tree branches and stems to cling on as they grow. Many medicinal and chemical producing plants survive better and produce more efficacious active ingredients deep inside forests than when exposed. Bamboo poles produce better culms when shielded against strong winds by taller and sturdier trees. Can NWFPs be sustained if the forests are destroyed?

Policy implication

As previously noted, data on NWFPs were incomplete, suspect, and most likely, not error-free. It is not clear whether the bureaucracy that supplies, compiles and publishes data on NWFPs has an appreciation for the need to have accurate, timely, and reliable information on these products, other than as basis for calculating forest charges. But since the collection of forest charges has been limited to rattan, almaciga resin, and naturally-growing bamboo from public forests, then it is likely that the various field offices had stopped monitoring and collecting information on other NWFPs. The classification of bamboo as a NWFP warrants that it be regulated, but some areas (like Region 8 and Negros Oriental in Region 7), do not keep track of bamboo production and transport. This is tantamount to bamboo becoming a non-regulated product in these areas. Although this is a welcome development for private entrepreneurs who are engaged in manufacturing bamboo products, non-regulation also means that with the current system, the products are ignored, with no data being compiled on how much bamboo has been produced, processed and sold. Information

that is important to the market and to decision makers is lost. DENR must seriously take a look at its NWFP policies, particularly those pertaining to the collection, processing, publishing of information on these products. Perhaps, it can adopt survey systems, data encoding and processing, verification procedures and testing that are used for agricultural products. DENR should harness developments in information and communication technology to facilitate data collection and processing, as well as to ensure the quality of its data, not only on NWFPs but on timber and other products and services that are important to doing business in the forestry sector. Foresters must be able to show they can accurately count bamboo poles which can be seen; otherwise, the public will be skeptical about the forestry sectorís role in measuring carbon, which is invisible to the naked eye. Policies may also have to be amended so that information on NWFPs can be accumulated regardless of whether they are levied forest charges or not.

As noted earlier, there is great disparity in allowable cuts granted to the various rattan cutting contractors in the different regions and provinces. As per DAO No.1989-4(1989) sustained yield cut (SYC) is calculated using the formula :

$$SYC = \left(\frac{A \times D}{r} \right) \times f$$

where: A = forested area in hectares
D = average density per hectare in lineal meters
r = rotation period of 15 years
f = recovery factor (85%).

One limitation of the formula is the absence of a minimum limit on how much could be economically harvested, which is likely offset by granting large areas to the contractor. Hence, there is potential for abuse of the contract in terms of overharvesting in areas where rattan resources are already strained. The findings of the present study may also offer some clue as to whether limits have to be set on areas granted to contractors. The study shows the large discrepancy between production and annual allowable cuts, so there is a need to assess what happened to actual harvest, monitoring, recording, and reporting of rattan production in the field. There is also need to evaluate the practical advantage of separating sustained yield estimates for rattan that are 2 cm in diameter or bigger against those that are smaller in diameter, as stipulated in the DAO. This segregation by size is not reflected in the statistics on allowable cuts, production, and even forest charges collected. There should be enough information on the basis of harvesting data in the past, on the size distribution of rattan given a lot of rattan poles.

Likewise, it is not clear whether the formula was based on previous studies to determine sustainable rattan yields, which is likely to differ from one area to another depending

on climate, soil conditions, and forest quality. Given the decline in rattan production volumes, there is a need to examine more closely if indeed the formula would ensure sustainable rattan production in the long run. As per records, production had been much lower than what has been allowed, which was presumably based on the formula as prescribed in the DAO. Assuming judicious application of the formula, overharvesting should be ruled out as a cause for declining rattan production. But if the formula is flawed, then revision is in order.

As a strategy to ensure that supply would meet future demand for rattan and bamboo, the Revised Master Plan for Forestry Development (RMPFD, 2003) proposed the expansion of areas planted to these NWFPs. In the light of competing demands for land due to increasing population and the concomitant rising demand for space, food, and services, expansion by planting more land with NWFPs might not be a feasible option. Because of their growth habits and requirements, NWFPs thrive better within forest areas. Plantation development may not be the only option available to supply the bamboo and rattan needed in the future. Enriching forest areas with bamboo, rattan, and other NWFPs would meet possible demand for these products while enabling them to contribute for meeting environmental objectives. Policies pertaining to the grant of incentives for plantation development may have to be revisited to include improving the stock of NWFPs in forest areas.

CONCLUSION

The study is a cursory attempt to find a cause-and-effect relationship between NWFP harvesting and the quality of the forests. Available records from the DENR on the production and export of and forest charges on NWFPs, particularly rattan and bamboo, were analyzed *vis a vis* forest area and quality of forests from provinces or regions that were the primary sources of various NWFPs. Over time, the nature and variety of NWFPs has diminished. Likewise, records of production of rattan have declined. The production of bamboo poles showed no specific pattern in the last 10 years. Records on bamboo appear to be incomplete, with no reports of production from many regions and provinces where these specific resources are known to exist. In the absence of documented information, it is quite perplexing how communities are able to meet their needs for such perishable products which are almost consumed on a day-to-day basis. The study also found that production of rattans is becoming limited to a few regions/provinces. Although these provinces still possess large forest areas, the quality of forest cover has diminished through time. The same could not be said about bamboo where the size of available forests may not be a necessary pre-condition for producing them. Evidence shows that it is now largely sourced from A and D lands.

While the study has not been able to directly relate NWFP harvesting with the quality of the forests, the opposite is undeniably happening ñ that is, forests diminution results in less NWFPs available. In future studies, it is recommended that methodology should

involve the use of analytical statistical models and the conduct of ocular visits to both NWFP extraction and non-extraction sites. There may also be a need to bring in information benchmarks using criteria and indicators for assessing compliance with sustainable forest management practices. The study recommends changes in policies pertaining to collection, compiling, and processing of information on NWFPs, the determination of sustained yields of NWFPs particularly rattan, and on incentives given to NWFP plantation development as the strategic direction to ensure that the supply of NWFPs will meet future demand.

REFERENCES

BAS (Bureau of Agricultural Statistics) 2009. Agricultural Statistical System in the Philippines. http://countrystat.bas.gov.ph/metadata_new.asp

DAO 1989-4, 1989. Revised Regulations Governing Rattan Resources. Department of Environment and Natural Resources, Visayas Ave., Diliman, Quezon City, Philippines.

DAO 2000-63, 2000. New Rates of Forest Charges Pursuant to Republic Act No. 7161 and Based on the 1999 FOB Market Price of Forest Products. Department of Environment and Natural Resources, Visayas Ave., Diliman, Quezon City, Philippines.

FAO (Food and Agriculture Organization of the United Nations), 1998. Philippines. Non-Wood Forest Products in 15 Countries of Tropical Asia. http://www.fao.org/DOCREP/005/ AB598E/ AB598E23.htm

FMB-DENR (Forest Management Bureau ñ Department of Environment and Natural Resources). 1970, 1971, 1997-2006. Philippine Forestry Statistics. Department of Environment and Natural Resources, Visayas Ave., Diliman, Quezon City, Philippines.

PD 705, 1975. Revised Forestry Code of the Philippines.

RA 7161, 1991. Forest Charges Law. Republic of the Philippines.

RMPFD (Revised Master Plant for Forestry Development), 2003. Forest Management Bureau, Department of Environment and Natural Resources; Food and Agriculture Organization of the United Nations; and United Nations Development Programme.

Rojo, J.P., Roxas, C.A., Pitargue, F.C. Jr. and BriÒas, C.A. 2000. Philippine Erect Bamboos: A Field Identification Guide. Forest Products Research and Development Institute, Department of Science and Technology, College, Laguna: 161p.

Virtucio, F.D. and Roxas, C.A. 2003. Bamboo Production in the Philippines. Ecosystems Research and Development Bureau, DENR, College, Laguna.

Virtucio, F.D. and Torreta, N.D. 2008. Bamboo Resources of the Philippines. Paper presented during the National Bamboo Development Forum held at Philippine Trade Training Center, Roxas Blvd., Pasay City, MetroManila, October 22-24, 2008.